CHAPTER 4. EVALUATE AN OPERATOR'S DEICING/ANTI-ICING PROGRAM

SECTION 1. BACKGROUND

1. PROGRAM TRACKING AND REPORTING SUBSYSTEM (PTRS) ACTIVITY CODES.

A. Maintenance: 3625

B. Avionics: 5625

3. OBJECTIVE. This chapter provides guidance for the Principal Maintenance Inspector (PMI) in assisting the Principal Operations Inspector (POI) in evaluating for approval proposed deicing/anti-icing program.

5. GENERAL. The current regulations in Title 14 of the Code of Federal Regulations (14 CFR) parts 121, 125 and 135 are based on the "clean aircraft concept." These regulations prohibit a takeoff when frost, ice, or snow (contamination) is adhering to the wings, control surfaces, or propellers of an airplane. Sections 121.629, 125.221, and 135.227 require that each part 121/135 operator who conducts operations under conditions that may produce frost/snow or ice accumulation, must have one or both of the following:

- An approved aircraft deicing program
- An inspection program that ensures that aircraft are free of any accumulation of frost/ice/snow prior to takeoff

A. Approval Process. The approval of an operator's deicing/anti-icing program involves the following steps:

(1) Reviewing the operator's program submission. It is both the PMI and the POI who initially review the proposed program to ensure that all required elements have been submitted. Once the PMI and the POI are satisfied that all of the required elements are suitably addressed, they will distribute copies of the program to all involved Aviation Safety Inspectors (ASI).

(2) Evaluating the operator's program submission. This step consists of conducting a detailed analysis of the proposed program, training, equipment, and facilities.

(3) Validation Testing. This step consists of validating the operator's performance during actual operations.

B. Issuance of Operations Specifications. At the conclusion of the process the POI who has primary responsibility for this job task approves the operations specifications. The operations specifications authorizes the operator to conduct operations under the program when conditions exist such that frost, ice, or snow may reasonably be expected to adhere to the operator's aircraft.

C. Provisions and Exceptions. An exception to the requirements for a complete deicing/anti-icing program is contained in § 121.629(d), which provides that an air carrier is not required to have an approved deicing/anti-icing program if an outside-the-aircraft check (OTAC) is completed within 5 minutes prior to beginning the takeoff. An OTAC must be performed from outside the aircraft to ensure the "wings, control surfaces, and other critical surfaces are free of frost, ice, and snow" when the certificate holder is operating in ground icing conditions. If a certificate holder chooses to operate in accordance with § 121.629(d), the requirement for an OTAC must be contained in its operations specifications.

7. PART 121 DEFINITIONS

A. Pretakeoff Check. A pretakeoff check is a check of the aircraft's wings, or representative aircraft surfaces for frost, ice, or snow within the aircraft's holdover time.

B. Pretakeoff Contamination Check. A pretakeoff contamination check is a check that the flightcrew and ground personnel conduct after the holdover time has been exceeded to make sure that the wings, control surfaces, and other critical surfaces, as defined in the operator's program, are free of frost, ice, and snow. The pretakeoff contamination check must be completed within 5 minutes before beginning the takeoff.

C. Outside-the-Aircraft Check (OTAC). An OTAC is a check that must be accomplished from

outside the aircraft. Section 121.629(d) requires an OTAC of a certificate holder who operates in ground icing conditions without an approved part 121 ground deicing/anti-icing program. For those operators without an approved program, any time conditions are such that frost, ice, or snow may reasonably be expected to adhere to the aircraft, an OTAC must be performed to ensure that the wings, control surfaces, and other critical surfaces are free of contamination.An OTAC must occur within 5 minutes prior to beginning the takeoff.

D. Holdover Time. Holdover time is the estimated time deicing/anti-icing fluid will prevent the formation of frost or ice, and the accumulation of snow on the treated surfaces of an aircraft. Holdover time begins when the final application of deicing/anti-icing fluid commences and expires when the deicing/anti-icing fluid applied to the aircraft loses its effectiveness.

SECTION 2. PROCEDURES

1. PREREQUISITES AND COORDINATION REQUIREMENTS.

A. Prerequisites:

- Knowledge of the regulatory requirements of parts 121, 125, or 135, as applicable
- Completion of the Airworthiness Inspectors Indoctrination Course or previous equivalent
- Completion of the Ground Deicing/Anti-Icing Operations Computer Based Instruction (CBI), Course 25007, as available

B. Coordination. This task requires coordination with primary operations inspectors and the operator.

3. REFERENCES, FORMS, AND JOB AIDS.

A. References:

- Advisory Circular (AC) 20-117, Hazards Following Ground Deicing and Ground Operations in Conditions Conducive to Aircraft Icing, as amended
- AC 120-58, Pilot Guide for Large Aircraft Ground Deicing, as amended
- AC 120-60, Ground Deicing and Anti-Icing Program, as amended
- AC 135-17, Pilot Guide - Small Aircraft Ground Deicing, as amended
- Federal Aviation Administration (FAA) Flight Standards Publication - Winter Operations Guidance for Air Carriers and Other Adverse Weather Topics
- FAA Order 8400.10, Air Transportation Operations Inspector's Handbook, volume 4, chapter 8, Ground Deicing/Anti-Icing Programs
- Society of Automotive Engineers, Inc. (SAE) ARP4737ac
- AMS 1424, Deicing/Anti-Icing Fluid, Aircraft, Newtonian - SAE Type I
- AMS 1428, Fluid, Aircraft Deicing/Anti-Icing, Non-Newtonian, Pseudo-Plastic, SAE Type II
- ISO 11075, Aerospace - Aircraft Deicing/Anti-Icing Newtonian Fluids ISO type I
- ISO 11076, Aerospace - Aircraft Deicing/Anti-Icing Methods with Fluids
- ISO 11077, Aerospace - Deicing/Anti-Icing Self Propelled Vehicles - Functional Requirements
- ISO 11078, Aerospace - Aircraft Deicing/Anti-Icing Non-Newtonian Fluids ISO type II
- Computer-Based Instruction (CBI) Programs: Evaluating and Approving a Ground Deicing/Anti-Icing Program (see RFSD/FSDO for a copy)
- AC 91-13, Cold Weather Operation of Aircraft
- AC 65-9A, Airframe and Powerplant Mechanics--General Handbook (see chapter 11), as amended
- Winter Operations, Douglas Aircraft Company
- Cold Weather Procedures, Air Carrier Operations Bulletin No. 7-82-2
- AC 65-15, Airframe and Powerplant Mechanics Airframe Handbook (see chapter 7), as amended
- AC 20-73, Aircraft Ice Protection (see chapter 2, sections 3 and 4)
- AC 135-9, FAR Part 135 Icing Limitations
- AC 23.1419-2, Certification of Part 23 Airplanes for Flight in Icing Conditions
- FAA-P-8740-24, Tips on Winter Flying, General Aviation
- Aircraft Deicing and Anti-Icing Procedures, Air Carrier Operations Bulletin No. 7-81-1
- Deicing of Aircraft with Engines Operating Order 8430-1A Maintenance Bulletins
- De-Icing/Anti-Icing Fluids Evaluation, Boeing of Canada, De Havilland Division Dash 8, all operator message No. 48
- Icing Precautions and Procedures, Boeing of Canada, De Havilland Division Dash 8, all operator message No. 49
- Wing Upper Surface Ice Detection MD-80, Douglas Aircraft Company, Douglas Service, First Quarter, 1990
- Aerodynamic Effects of Deicing Fluids, Boeing Airliner, Oct.-Dec. 1989
- Airplane Ground Deicing/Anti-Icing, Boeing Airliner, Oct.-Dec. 1989

- Deicing/Anti-Icing, Boeing Airliner, Oct.-Dec. 1989
- Winter Operations—An Update, Boeing Airliner, Oct.-Dec. 1989
- AC 91-6, Water, Slush, and Snow on the Runway, as amended
- Effects of Leading Edge Contamination on Aerodynamic Performance, ACOB 8-83-1
- Turbojet Aircraft Engine Icing During Prolonged Operations in Icing Conditions, ACOB 8-83-1

NOTE: Numerous video tapes have been produced by manufacturers of deicing/anti-icing products and by aircraft operators. Access to these tapes may be available through the regional deicing/anti-icing coordinator or AFS-500.

B. Forms. None.

C. Job Aids. None.

5. PROCEDURES.

A. Brief the Operator.

(1) Assist the operator in acquiring all of the pertinent published information.

(2) Ensure that the operator is familiar with the technical difficulties that may be involved and the regulatory requirements that must be met.

(3) Outline for the operator those elements which must be contained in the operator's proposed program and the actions which will be required at each stage of the approval process.

B. Review the Operator's Submittal.

(1) If the submission is incomplete, immediately inform the operator and determine if the operator intends to complete the package.

(2) If the submission is complete, inform the operator and distribute the elements to the appropriate inspectors for initial examination.

(3) If the package is unacceptable, discuss with the operator those elements which were unacceptable, and/or return the package with a letter outlining the deficiencies.

C. Evaluate the Operator's Deicing/Anti-Icing Program.

(1) Ensure that the manual provides all categories of employees with instructions and information allowing them to perform their duties with a high degree of safety.

(2) Ensure that the operator's manual material covers the following:

- Clear identification of each category of employee with responsibility for deicing/anti-icing program elements
- Duty definition of each category of employee involved
- Background information and step-by-step procedures
- Checklists, where appropriate, that will allow each category of employee to perform their responsibilities to the required standard

(3) To ensure that the program complies with § 121.629(c), each operator's ground deicing/anti-icing program must cover the following as described in AC 120-60:

- Management plan detailing operational responsibilities and procedures

D. Management Plan. The operator should develop, implement, and use a management plan to ensure proper execution of its approved deicing/anti-icing program. The management plan should include operations and maintenance responsibilities and identify the management positions that are responsible for ensuring that all necessary elements of the deicing/anti-icing program are properly executed.

E. Holdover Timetables and the Procedures for their Use. Ensure that each operator has developed, and has available, holdover timetables for use by its personnel. In addition, each operator must make its holdover timetables available for use in the cockpit. These timetables are required to be supported by data acceptable to the Administrator. Currently, the only acceptable data is that developed by the Society of Automotive Engineers (SAE) and International Standards Organization (ISO).

F. Evaluate the Operator's Training. Ensure that the operator has developed a training program that qualifies each category of employee with responsibilities for deicing/anti-icing. Flightcrew training must be incorporated into the operator's approved training program. The training program must include the following:

- General procedures along with any specific requirements for each make, model, and variant of aircraft used by the operator
- Means of testing, qualification, and requalification for each category of employee involved in the program

- Demonstration of proficiency, by performance, of flight crewmembers, equipment operators, and inspectors

- Procedures for recurrent training

(1) Certificate Holder Who Does Not Operate in Ground Icing Conditions. The part 135 ground deicing rule does not apply to a certificate holder who does not operate in ground icing conditions. Under the regulation, ground icing conditions exist any time weather conditions are such that frost, ice, or snow may reasonably be expected to adhere to the airplane. The certificate holder who does not operate in ground icing conditions is not required to train its pilots or develop pretakeoff contamination procedures. Certificate holders who do not operate in ground icing conditions will have that limitation in Paragraph A4b of their operation specifications.

(2) Operators Who Use Only One Pilot in Their Operations. Operators who use only one pilot in their operations (single-pilot operator) are not required to comply with the manual and approved training requirements of § 135.21 or § 135.341. Therefore, single-pilot operators are not required to have an approved pilot training program nor the additional training required by the part 135 ground deicing rule. However, single-pilot operators must comply with all the operational requirements of the part 135 ground deicing rule. Those operational requirements include a pretakeoff contamination check or an approved alternative procedure to the pretakeoff contamination check described in its operation specification. The pilots of these types of operators will need to demonstrate knowledge to operate in ground icing conditions during the initial and recurrent flight checks. A single-pilot operator will have an aircraft-specific description of the pretakeoff contamination check in Paragraph A 23 of its operations specifications.

(3) Helicopter Operations. Helicopter operations conducted under part 135 are excluded from the additional training and pretakeoff contamination check requirements of the FAR Part 135 ground deicing rule. However, the regulation requires the "clean aircraft concept" for helicopters.

G. Training Requirements of Part 135 Ground Deicing Rule. For operators who are required to have an approved training program, their training program must include pilot ground training in those subject areas relating to deicing and anti-icing operations required by § 135.345 for initial, transition, and upgrade training and by § 135.351 for recurrent training and testing. These training requirements must include procedures for operating airplanes during ground icing conditions. The operator must provide that training to its pilots and all other participating personnel. The training must include at least the following elements:

(1) Use of Holdover Times. In part 135 operations, holdover times are only advisory and serve as guidance to the pilot in making takeoff decisions. If the operator uses the deicing/anti-icing fluids, it must train its pilots in the use of holdover times.

(2) Airplane Deicing/Anti-Icing Procedures. Airplane deicing/anti-icing procedures include inspections and check procedures, and responsibilities and requirements for the pretakeoff contamination check or alternative procedures, as applicable.

(3) Communications. The operator must provide training for all company personnel in communicating with all agencies involved in the deicing/anti-icing process and the decision making process.

(4) Contamination. Aircraft surface contamination training includes how to identify frost, ice, or snow, and how to locate critical areas. Training should include an explanation of how small amounts of surface contamination adversely affect aircraft performance and flight characteristics.

(5) Deicing/Anti-icing Fluids. If the operator uses deicing/anti-icing fluids, it must train its pilots, as well as any other participating personnel, in the types and characteristics of deicing/anti-icing fluids.

NOTE: It is important that flightcrews do not use deicing/anti-icing fluids unless they have been trained in the characteristics and effects of these fluids on their operation.

(6) Cold Weather Preflight—Inspection Procedures. Training should include procedures for cold weather preflight inspections.

(7) Contamination Recognition. This aspect of training should cover techniques for recognizing contamination on the aircraft for use during both the preflight inspection and the pretakeoff contamination check.

NOTE: Other than part 135 single pilot operators, who must have the pretakeoff contamination check procedures described in their operations specifications, both parts 121 and 135 operators must have documentation in their general manuals (GM) or flight manuals for the procedures they intend to use to comply with their respective deicing/anti-icing rule.

7. TASK OUTCOMES.

A. File PTRS Data Sheet.

B. Completion of this task will result in one of the following:

(1) For program approval, the issuance of operations specifications.

(2) For program disapproval, listing of the resulting restriction in operations specifications paragraph A4b.

C. Document Task. File all supporting paperwork in the operator's office file.

9. FUTURE ACTIVITIES. Normal surveillance.